

REMARKS/ARGUMENTS

1. In the above referenced Office Action, the Examiner rejected claims 1, 4, 5, 10, 11, 13, 14, 19-22, and 27 under 35 USC § 103 (a) as being obvious over by Lu (U.S. Patent No. 5,991,346) in view of Torsti (U.S. Patent No. 5,724,397); claim 2 under 35 USC § 103 (a) as being unpatentable over Lu (U.S. Patent No. 5,991,346) in view of Torsti (U.S. Patent No. 5,724,397) and further in view of Serfaty (U.S. Patent No. 4,651,026); and claims 3 and 12 under 35 USC § 103 (a) as being unpatentable over Lu (U.S. Patent No. 5,991,346) in view of Torsti (U.S. Patent No. 5,724,397) and further in view of Roberts (U.S. Patent No. 4,575,683). In addition, the Examiner objected to claims 6-9, 15-18, and 23-26 as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claim.

Claims 1-27 are currently pending in this application. Claims 1, 5-6, 11, 14-15, 22-23 are currently amended. These rejections have been traversed and, as such, the applicant respectfully requests reconsideration of the allowability of claims 1-6, 10-15, 19-23, and 27.

2. Claims 1, 4-5, and 10 have been rejected under 35 USC § 102 (b) as being anticipated by Lu (U.S. Patent No. 5,991,346) in view of Torsti (U.S. Patent No. 5,724,397).

Torsti recites as follows:

To synchronize the sampling frequency of the analog-to-digital converter 2, the first reference sample $S(-1)$ obtained from the output of the delay means 13 and the second reference sample $S(1)$ obtained from the output of the analog-to-digital converter 2 are applied to the calculator 8. The calculator 8 calculates:

a difference $E = S(-1) - S(1)$ of the samples $S(-1)$ and $S(1)$ used for synchronization,

the difference of the difference E and a target value K , after which the difference is divided by $D(0)$ or the sign of $D(0)$ to determine synchronization information SI .

The single synchronization information SI obtained from the output of the calculator 8 is applied to a low-pass filter 10 to remove the effect of momentary disturbances. The low-pass filter 10 is preferably a digital IIR filter.

The single synchronization information SI also contains symbol interaction. To remove the interaction, the synchronization information SI is applied from the low-pass filter 10 to the PI controller 11, which is used for summing (integrating) the synchronization information obtained from several different symbols.

In applying the method of the invention, the target value K is adjusted, preferably in such a

manner that as the synchronization progresses, the value of K is changed gradually towards the optimum target value, which is preferably zero. It is thus possible to carry out the synchronization in several stages, roughly at first, after which the synchronization becomes more and more accurate as the target value K changes. (See Torsti, Col. 4, lines 4-33)

Torsti calculates a difference between samples $S(-1)$ and $S(1)$ and a threshold K and divides by $D(0)$ (or the sign of $D(0)$). This value is low-pass filtered and applied to a PI controller that provides a proportional component and a component that integrates over multiple such differences that is used to adjust the clock 3.

Claim 1 has been amended to recite, updating the determined sampling phase based on at least one of an overflow of an accumulator and an overflow of an accumulator. Support for this amendment is presented, for instance, in the specification page 13, line 1 through page 14, line 19. No new matter has been added. Claims 5 and 6 have been amended to correspond to the amended claim 1.

Torsti does not disclose updating the determined sampling phase based on at least one of an overflow of an accumulator and an underflow of the accumulator. As discussed above, for a current sample $S(0)$, Torsti calculates a difference between the last sample, $S(-1)$, and the next sample $S(1)$, after subtracting a decreasing threshold K . For these reasons, claim 1 and claims 2-10

that depend therefrom are believed to be patentably distinct from the prior art.

3. Claims 11, 13-14, and 19 have been rejected under 35 USC § 102 (b) as being anticipated by Lu (U.S. Patent No. 5,991,346) in view of Torsti (U.S. Patent No. 5,724,397).

Claim 11 has been amended to include:

for a current reference crossing of the at least one reference crossing, determining a corresponding current sampling phase;

comparing the determined sampling phase to the corresponding current sampling phase;

when the comparison of the determined sampling phase to the corresponding current sampling phase is unfavorable, adjusting an accumulator; and

updating the determined sampling phase based on a value of the accumulator.

Claims 14 and 15 have been amended to correspond to the amended claim 11.

Torsti does not disclose updating the determined sampling phase based on these particular operations. As discussed above, for a current sample $S(0)$, Torsti calculates a difference between the last sample, $S(-1)$, and the next sample $S(1)$, after subtracting a decreasing threshold K . For these reasons, claim 11 and claims 12-15

and 19 that depend therefrom are believed to be patentably distinct from the prior art.

4. Claims 20-22, and 27 have been rejected under 35 USC § 102 (b) as being anticipated by Lu (U.S. Patent No. 5,991,346) in view of Torsti (U.S. Patent No. 5,724,397).

Claim 20 has been amended to include:

determining a current sampling phase based on a current reference crossing of the encoded signal, comparing the determined sampling phase to the current sampling phase, when the comparison of the determined sampling phase to the corresponding current sampling phase is unfavorable, adjusting an accumulator, and updates the determined sampling phase based on a value of the accumulator.

Claims 22 and 23 have been amended to correspond to the amended claim 20.

Torsti does not disclose updating the determined sampling phase based on these particular operations. As discussed above, for a current sample $S(0)$, Torsti calculates a difference between the last sample, $S(-1)$, and the next sample $S(1)$, after subtracting a decreasing threshold K . For these reasons, claim 20 and claims 21-23 and 27 that depend therefrom are believed to be patentably distinct from the prior art.

5. Claim 2 has been rejected based on the combination of Lu, Torsti and Serfaty (U.S. Patent No. 4,651,026).

Claim 2 is dependent upon claim 1, which has been shown to overcome its corresponding rejection. Since Lu and Torsti fails to render claim 1 obvious, combining the teachings of Lu and Torsti with Serfaty fails to render claim 2 obvious.

6. Claims 3 and 12 have been rejected under 35 USC § 103 (a) as being unpatentable over the combination of Lu, Torsti and Roberts.

Claim 3 is dependent upon claim 1, which has been shown to overcome its corresponding rejection, and claim 12 is dependent upon claim 11, which has been shown to overcome its corresponding rejection. Since Lu and Torsti fails to render claim 1 or 11 obvious, combining the teachings of Lu and Torsti with Roberts fails to render claim 3 or 12 obvious.

For the foregoing reasons, the applicant believes that claims 1-27 are in condition for allowance and respectfully request that they be passed to allowance.

The Examiner is invited to contact the undersigned by telephone or facsimile if the Examiner believes that such a communication would advance the prosecution of the present invention.

RESPECTFULLY SUBMITTED,

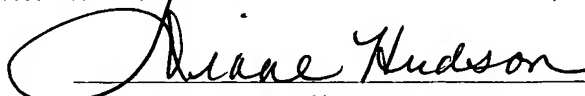
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